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ABSTRACT

A new readability formula is designed to work on passages that are 40 to 99 words long, while existing readability formulas require a passage of 300 words or longer. The new formula requires the passage to have at least three sentences and is reliable for the fourth through the twelfth grades. (Four figures which demonstrate the use of the formula are included.) (RS)

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# A READABILITY FORMULA FOR SHORT PASSAGES

by

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# A READABILITY FORMULA FOR SHORT PASSAGES

One of the persistent problems of readability formula users has been "What do you do if you have only a short passage?" Most readability formulas require a passage of 300 words or longer.

This presents a problem for assessing readability of short but important passages such as might be found in science textbooks, math textbooks, passages used in tests, manufactures warrantees, and rules and procedures such as might be found in drivers license booklets.

Even though the use of readability formulas has been questioned or criticized by some, those objections were at least partially answered (Fry, 1989) and the use of readability formulas continues unabated by many in education, publishing, business, and legal situations. The Social Science Citations Index shows that readability articles are among the most frequently cited research in a wide variety of professional articles.

The new readability formula given here in Figures 1 and 2 is designed to work on passages from 40 to 99 words long provided that they contain at least 3 sentences. For anything shorter than that, you can get some insights from word difficulty and sentence difficulty but a readability score is apt to be considerably less reliable.

This new Short Passage Readability Formula leans heavily on the research done by Edgar Dale and Joseph O'Rourke, which is published in their dictionary-type book The Living Word Vocabulary (1977). This book gives a grade level for 43,000 different items, which is probably about 99% of all words used below the 13th grade.

An important feature of this book is that it gives grade level by meaning. For example, the word "convention" has three meanings and three entries (items). "Convention" meaning "a meeting" is at 6th-grade level (is known by a majority of 6th graders), "convention" meaning "custom" is at the 10th-grade level and "convention" meaning "a diplomatic agreement" is at the 12th-grade level. Hence in using the formula, you must look up each key word by its particular meaning in the passage, and assign it a grade level. The average of the 3 hardest key words is one input for the formula. A key word is defined as a word necessary for understanding the passage. Usually the key words are the most difficult words in the passage.

The second major input for the Short Passage Readability Formula is a sentence difficulty measure that can be obtained for each sentence from the chart in Figure 3. This chart is based on the median sentence difficulty of the Readability Graph (Fry 1977). The grade level of all the sentences in the short passage are averaged.

Then the Sentence Difficulty and Key Word Difficulty are averaged to give a Readability Grade Level. Thus this formula follows the insight by Klare (1984) which held that both a word difficulty (sematic) and a sentence difficulty (syntax) are necessary for a readability formula. My research, Figure 4, found this to be true, neither measure alone is sufficiently accurate.

This Short Passage Readability Formula is useful for judging the difficulty level of passages from 4th grade through 12th grade. The reason it is not useful below 4th grade is that The Living Word Vocabulary does not measure difficulty below 4th grade. However it is possible to get a formula score below 4th grade because of the lower numbers on the Sentence Difficulty Chart. I recommend that any score of 4.0 or below be reported as simply "4th Grade or below".

At the upper level I recommend that any score of 12.9 or above be reported as "12th grade or above". The reason for this is that a lot of variability was observed at the upper levels. See Figure 4. For example, in validating the formula by doing a Product Moment Correlation between a short passage score and a longer passage (300 words or longer) using the Readability Graph Score, most of the invalidity was caused by the passage at 15th-grade level. The correlation for all passages was .82 but with the 15th-grade passage removed, it was .95.

Well, here is a readability formula for use on short passages. I hope it will be useful for all sorts of people who need some kind of objective readability measure for short passages. I am not advocating that subjective judgment, or better yet, try outs on a sample audience be abandoned, but I am advocating that an objective measure like a readability formula be used when it is important to determine the difficulty level of any prose passage. It aids the teaching of reading, it aids learning from text, and it aids in the written communication of ideas. And these are goals that many of us share.

Figure 1

A SHORT PASSAGE READABILITY FORMULA

Rules

1. Use on a passage that is at least 3 sentences and 40 words long.

2. Select at least 3 key words that are necessary for understanding the passage. You may have more key words.

3. Look up the grade level of each key word in "The Living Word Vocabulary".

4. Average the 3 hardest key words. This gives you Word Difficulty.

5. Count the number of words in each sentence and give each sentence a grade level using the Sentence Length Chart.

6. Average the Grade Level of all sentences. This gives you Sentence Difficulty.

7. Finally, average the Sentence Difficulty (Step 6) and the Word Difficulty (Step 4). This gives you the Readability Estimate of the short passage.

$$\text{Readability} = \frac{\text{word difficulty} + \text{sentence difficulty}}{2}$$

Cautions

A. This method should be used only when a long passage is not available. Anything 300 words or longer, use the regular readability graph.

B. This method was developed on passages at least 3 sentences and 40 words long. Anything shorter than that, use at your own risk. It may be better than nothing, but certainly has less reliability.

C. Be careful when looking up the grade level of the key words that you get the grade level for the same meaning as the meaning of that key word as it is used in the passage.

D. Range 4-12. In reporting any score 4.0 or below, call it "4th grade or below" and any score above 12.9 call "12th grade or above".

Figure 2

A SAMPLE PASSAGE

These record-smashing feats were accomplished at the 39th annual convention of the International Jugglers Association, held in San Jose, California. In that contest, Anthony competed against the world's best jugglers. Many were more than twice his age, but there was no doubt who was best.

| Sentence Length | Grade |
|---|---|
| 21 | 8.5 |
| 10 | 3 |
| 15 | 6 |
| 3 | 17.5 |

5.8 Average Sentence Difficulty

| Key Words (3 hardest only) | |
|---|---|
| 6 | (feats) |
| 6 | (convention) |
| 8 | (contest) |
| 3 | 20 |

6.7 Average Key Word Difficulty

5.8 Sentence Difficulty
6.7 Key Word Difficulty

2 12.5

6.3 Readability Score (in Grade Level)

Notes:

The word "jugglers" was suggested as a possible key word, but that word is not in The Living Word Vocabulary list. So it was not included.

Four other words were looked up. One word "association" (Level 6) was not used because the formula rules state that only the three hardest words be used in obtaining the average key word difficulty.

The word "convention" has three different meanings with a different grade level for each meaning. This passage used "convention=meeting Level 6", not "convention=custom Level 10" or "convention=diplomatic agreement Level 12".

Figure 3

SENTENCE DIFFICULTY CHART

| Grade Level | Words Per Sentence |
|---|---|
| 1 | 6.6 or below |
| 2 | 8.6 |
| 3 | 10.8 |
| 4 | 12.5 |
| 5 | 14.2 |
| 6 | 15.8 |
| 7 | 18.2 |
| 8 | 20.4 |
| 9 | 22.2 |
| 10 | 23.2 |
| 11 | 23.8 |
| 12 | 24.3 |
| 13 | 25.0 |
| 14 | 25.6 |
| 15 | 26.3 |
| 16 | 27.0 |
| 17 | Above 27 |

Figure 4

Comparison of Key Word Readability Estimate on Short Passages with Readability Graph Scores on Large Passages.

| Passage | Readability Large Passage 300 Words or More | Type Narrative Expository | Length Short Passage | Key Word Difficulty | Sentence Difficulty | Readability Short Passage |
|---|---|---|---|---|---|---|
| A | 5 | E | 69 | 4.6 | 4.9 | 4.7 |
| B | 3 | N | 49 | 4.6 | 4.0 | 4.3 |
| C | 7 | N | 74 | 5.3 | 8.4 | 6.8 |
| D | 6 | N | 52 | 4.7 | 5.7 | 5.2 |
| E | 6 | E | 46 | 6.7 | 5.8 | 6.3 |
| F | 8 | N | 59 | 8.6 | 6.0 | 7.3 |
| G | 7 | N | 65 | 6.0 | 6.2 | 6.1 |
| H | 8 | E | 82 | 6.0 | 9.8 | 7.9 |
| I | 8 | E | 66 | 8.6 | 6.2 | 7.4 |
| J | 10 | E | 99 | 8.0 | 9.2 | 8.6 |
| K | 12 | N | 68 | 15.0 | 11.3 | 13.1 |
| L | 15 | E | 61 | 10.6 | 8.3 | 9.4 |
| M | 10 | E | 69 | 6.0 | 12.5 | 9.2 |
| N | 4 | E | 42 | 4.0 | 3.2 | 3.6 |
| Mean | 7.7 | | 66.7 | 6.8 | 7.2 | 7.1 |

Product Moment Correlation between Readability of Large Passage (graph) and Short Passage Readability is .82 for all passages and .95 if Passage L (15th grade) is removed.

All numbers are Grade Level Scores except Length, which is in number of words.

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